

NOTES ON A CYCAD COMMUNITY AND ASSOCIATED VEGETATION IN NATAL

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INTRODUCTION

The following account and preliminary check-list of a cycad (*Encephalartos natalensis*) community and the associated vegetation is based on observations made and plants collected on a number of visits to the site during 1966. The cycads are on a farm Hopewell (1: 250,000 Topocadastral Map, 1953), in the Richmond district of Natal, owned by Mr. A. E. Mapstone. The cycad site is about 14 km south of Thornville Junction at the intersection of co-ordinates 29° 50' south and 30° 25' east (Fig. 1).

An interesting feature of the community is the presence of many pre-angiosperm plants. According to records, including Dyer (1965), the cycads are at least 50 million years old and evolved during the Carboniferous or Permian periods. The large number of ferns (*Polypodium polypodioides*, *Pleopeltis macrocarpa*, *Asplenium* spp. and *Vittaria isoetifolia*), lycopods (*Lycopodium gnidioides* and *L. verticillatum*), various mosses and lichens adds to the conclusion that this is an ancient plant community, the relic of a past age, and is worthy of permanent record.

Under present environmental conditions there is no danger of this cycad population dying out, as there is evidence of vigorous regeneration in the immediate vicinity of the adults. Small seedlings, 0.5 m high with a single leaf, were common in rock crevices, sheltered from direct sunlight, where leaf-mould had accumulated. Seedling mortality rate, however, must be great as the proportion of seedlings to young adults is high.

GEOMORPHOLOGY AND SOILS

A prominent topographic feature of the area is a 50 m high, northwest-facing faultline scarp with downthrow to the northwest. The resistant band of Table Mountain Sandstone along the edge of the scarp has been incised at right angles by a small tributary of the Mlazi River.

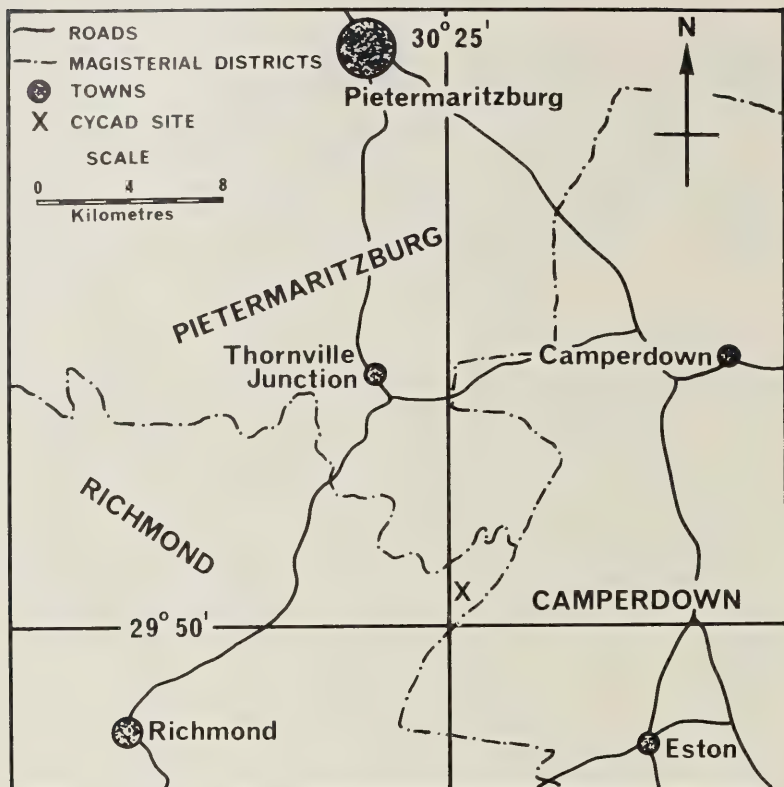


FIGURE 1.
The location of the Cycad site.

Soils on the level ground above the scarp are sandy and shallow, especially towards the edge of the scarp. Sandstone talus boulders litter the steep slopes where the soil is likewise sandy and shallow.

CLIMATE

Summarized climatic data (Fig. 2) for Pietermaritzburg (Weather Bureau, 1954), the nearest weather station, give some indication of the climate prevailing at Hopewell.

Differential insolation between aspects has a major discriminative influence on vegetation in Natal: soils of north-facing slopes become warmer and drier than those of south-facing slopes. This phenomenon is illustrated at Hopewell where, on the north-facing slopes a dry woodland vegetation is found, while on the more mesic south-facing slopes scrub-forest is developed.

Frost is considered a more important limiting factor for the distribution of many plants in Natal than high temperatures. From observation, plants are better able to recover from severe wilting, caused by high air temperature and associated low humidity, than from the effect of sub-zero temperatures. The cultivation in the district of sugar cane, a tropical crop, suggests that Hopewell is relatively frost free.

VEGETATION

Cycad community

Three large clumps and numerous scattered individuals of *E. natalensis* were found on a boulder littered slope where the scarp has been incised by the

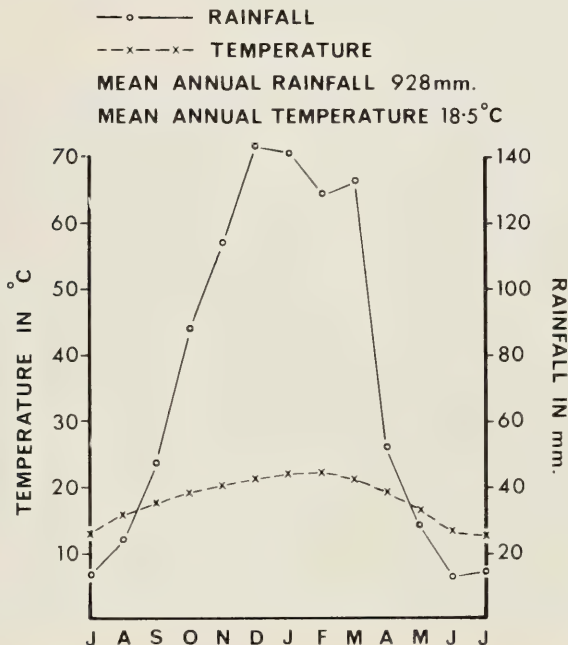


FIGURE 2.
Summarized climate data for Pietermaritzburg (after Walter, 1963).

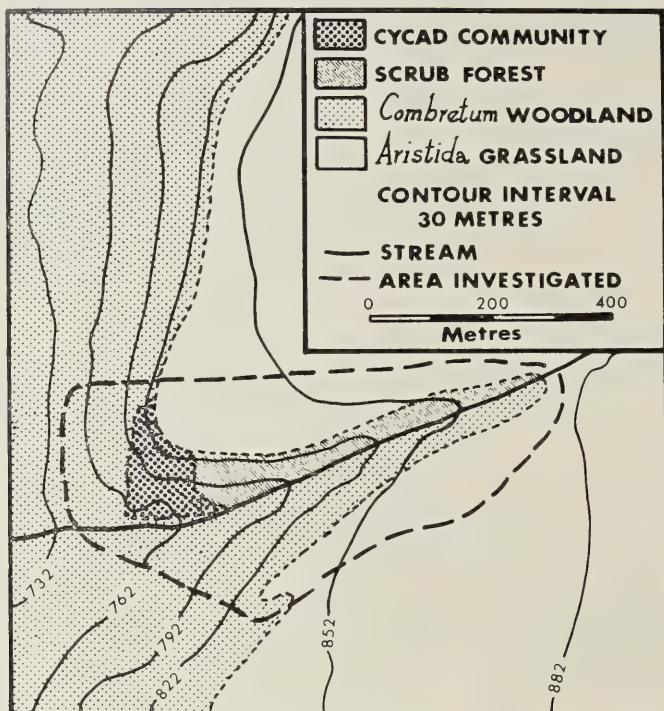


FIGURE 3.
Topographic map of the Cycad site showing the approximate boundaries of the communities discussed and the area investigated in detail.

stream (Fig. 3). The terrain is exceedingly rugged, consisting of large blocks of sandstone talus. Little soil is found, except where it has accumulated between boulders and is held by a fibrous root-mat.

Individual cycad trees may be 4–5 m high with stems 30–50 cm in diameter, each stem being terminated by a rosette of leaves in typical cycad fashion. Over sixty crowns were counted in the population and 50% had cones, in the ratio of one male to every two females.

Investigation of the large clumps showed that each comprised some 20 stems, derived from probably six to ten “parent” individuals which have produced suckers from the base to form an aggregate individual of up to 12 stems (Plate 1). Dyer (1965) suggests that although individual stems may be as much

as 500 years old, the rootstocks which produce suckers may be a thousand or more years old.

Epiphytes are common on the cycads, especially towards the apices where there is more shading by the apical rosette of leaves. The persistent leaf bases and alternating woolly bracts provide an ideal substrate (Plate 2). The most common epiphytes are lichens, bryophytes, ferns (*Polypodium polypodioides* and *Asplenium* spp.) and angiosperms (*Angraecum conchiferum*, *Mystacidium gracile*, *Peperomia reflexa* and *Crassula* spp.).

Associated trees in the Cyad Community are *Urera tenax*, *Calpurnia aurea* and *Clausena anisata* and these attain a height of 3—5 m. More occasional trees are *Ficus burtt-davyi* and *Clerodendrum glabrum*. Shrubs such as *Grewia occidentalis* and *Iboza riparia* also occur.

Scrub-forest

Scrub-forest is found on the south-facing, boulder strewn slopes of the small valley. It extends from the upper reaches of the stream to the cycad community.

Three ill-defined layers may be distinguished in the scrub-forest though



PLATE 1.

A clump of eight specimens of *E. natalensis* growing from a single rootstock.



PLATE 2.

Epiphytic *Crassula* sp., *Polypodium polypodioides* and *Asplenium* sp. on *E. natalensis*.

a certain amount of disturbance, such as the cutting of poles and the movement of cattle through the forest, prevents the development of true stratification. The upper canopy varies considerably in height from 4—13 m, and in most parts a closed canopy is formed. Composition is rather mixed, the more common canopy species being *Rapanea melanophloeos*, *Canthium mundianum*, *Xymalos monospora*, *Clerodendrum glabrum* and *Kiggelaria africana*.

From the composition of the canopy species, and with some knowledge of their performance in Natal, it is evident that the climatic climax in this area is not tall forest typical of comparable areas such as Table Mountain (Killick,

1959). The species are almost wholly pioneer or forest margin trees capable of tolerating a wider range of climatic conditions than climax forest species. For this reason, and because of the poor development of strata, the forest is referred to as scrub-forest.

Below the canopy is a discontinuous and ill-defined shrub layer. Common species present are *Maytenus mossambicensis*, *Tricalysia lanceolata*, *Clausena anisata*, *Canthium ciliatum* and *Dracaena hookeriana*.

The field layer is very poorly developed owing to the rugged terrain. Some of the common species are *Cyperus albostratus*, *Panicum aequinerve*, *Dietes vegeta* and *Impatiens duthieae*.

A feature of this and other scrub-forest in Natal is the abundance of lianes. The most common species are *Cnestis natalensis* and *Acacia ataxacantha*. These are of ecological significance as they greatly increase the density of the canopy.

Combretum Woodland

Open or closed *Combretum* Woodland with a short herbaceous understory, occurs on the steep, dry, north-facing scarp slopes (Plate 3). The trees present are fairly uniform in height, 3—4 m, and most are deciduous or semi-deciduous



PLATE 3.

Combretum Woodland, showing *Combretum gueinzii* and *Aloe candelabrum* with *Aristida junciformis* grassland understory. Note the scattered talus boulders.

during the dry winter season. Common species are *Combretum gueinzii*, *Aloe candelabrum*, *Dombeya rotundifolia*, *Acacia* spp., *Erythrina latissima* and *Sclerocarya caffra*.

Shrubs are present though very scattered, the most frequent being *Lantana rugosa* and *Lippia javanica*.

Common plants of the herbaceous layer are grasses such as *Hyparrhenia hirta*, *Themeda triandra*, *Aristida junciformis*, *Heteropogon contortus*, *Eragrostis capensis*, *Tristachya hispida* and *Rhynchelytrum setifolium*. These species form a layer up to 1 m high and common associated herbs are *Thesium costatum*, *Cyanotis nodiflora*, *Acalypha glabrata* and numerous other species, especially legumes and composites.

Rock outcrops are common in the *Combretum* Woodland and have a distinct flora, with *Ficus* spp., *Ekebergia pterophylla* and *Canthium mundianum* the most common trees.

The grass management policy of the area is to burn-off the grassland in autumn or winter, the fires being started on the flat area above the scarp slope. One factor limiting *Combretum* Woodland to the steep slopes is the absence of hot grass fires from such areas. On level ground, where the soil is deeper and the grass cover better, fires are usually hot enough to kill, or seriously retard most of the woody vegetation. On steep slopes with shallow soils, fires, although occurring, are not as fierce. The fires, usually fanned by a slight wind, burn fiercely to the edge of the scarp slope then burn slowly down the slope where there is little wind fanning the blaze.

Aristida Grassland

Grassland of mixed composition, with *Aristida junciformis* as the main constituent, is found on the flat land above the scarp slope. The soils are generally greater than 30 cm deep, except towards the edge of the scarp where they became very shallow and the sandstone itself is exposed.

Near the cliff edge, stages in the succession from lithosere to grassland are found as the soil gets progressively deeper. Pioneer invaders of bare rocks are lichens followed by *Selaginella mitenii* which forms extensive mats over the rocks (Plate 4). Soil particles are held by the fibrous root system and these mats are invaded by pioneer angiosperms such as *Aristida barbicollis*, *Loudetia simplex*, *Bulbostylis* spp., *Mariscus* spp. and *Commelina* spp.

The fire climax grassland, known as Open Bush Sandy (Pentz, 1943) or Ngongoni Veld (Acocks, 1953), has a variety of species present. Common grasses are *Aristida junciformis*, *Hyparrhenia* spp., *Heteropogon contortus*, *Themeda triandra*, *Alloteropsis semialata* and *Brachiaria serrata*. Associated grassland species are not common, which is a feature of this type of grassland.



PLATE 4.

Grassland covering shallow soil above the scarp, the common grass is *Aristida junci formis*. The fault-formed valley is in the middle-distance.

ACKNOWLEDGEMENTS

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figures, the Head of the Botany Department of the University of Natal, Pietermaritzburg for facilities and the Chief and staff of the Botanical Research Institute for naming some of the specimens.

REFERENCES

- ACOCKS, J. P. H. (1953). Veld types of South Africa. *Mem. Bot. Surv. S. Afr.* **28**.
 DYER, R. A. (1965). The cycads of Southern Africa. *Bothalia* **8** : 405-516.
 KILLICK, D. J. B. (1959). An account of the plant ecology of the Table Mountain area of Pietermaritzburg, Natal. *Mem. Bot. Surv. S. Afr.* **32**.
 PENTZ, J. A. (1943). *An Agro-ecological survey of Natal*. Bull. **250**, Dept. Agric. and Forestry, Govt. Printer: Pretoria.
 WALTER, H. (1963). Climatic diagrams as a means to comprehend the various climatic types for ecological and agricultural purposes. *The water relations of plants*; ed. A. J. Rutter and Whitehead, F. H. Blackwell: London.
 WEATHER BUREAU (1954). *Climate of South Africa*, Part I. W.B. **19**. Govt. Printer: Pretoria.

LIST OF PLANTS RECORDED

(Nomenclature after (i) ALSTON, A. H. G. AND SCHELPE, E. A. C. L. E. (1952). An annotated check-list of the Pteridophyta of Southern Africa. *J. S. Afr. Bot.*, **18**; and (ii) PHILLIPS, E. P. (1951). *The Genera of South African flowering plants*. Govt. Printer: Pretoria.)
 The collection of vascular flora given in this list is not comprehensive, but includes the majority of species occurring in the area.

Species within genera have been arranged alphabetically.

Abbreviations following each species show the distribution within the area and are taken from Fig. 3; here A=*Aristida* Grassland, C=Cycad Community, F=Scrub-forest and W=*Combretum* Woodland.

PTERIDOPHYTA

Lycopodioides

LYCOPODIACEAE

- Lycopodium gnidioides* L. (C)
L. verticillatum L.f. (C)

SELAGINELLACEAE

- Selaginella dregei* (Presl) Hiern (C, F)
S. mittenii Bak. (A)

Filicales

POLYPODIACEAE

- Oleandra distenta* Kunze (C)
Pteridium aquilinum (L.) Kuhn (A, C, F, W)
Cheilanthes multifida Sw. (C)
Pellaea calomelanos (Sw.) Link (A, C)
P. viridis (Forsk.) Prantl var. *glauca* Sim (A, C)
Vittaria isoetifolia Bory (C)
Asplenium aethiopicum (Burm.) Bech. (C)
A. rutaefolium (Berg.) Kuntze (C)
A. theciferum (H.B.K.) Mett. var. *concinna* (Schrad.) C. Chr. (C)
Fleopeltis macrocarpa (Bory ex Willd.) Kaulf. (C)
Polypodium polypodioides (L.) Hitchc. s. sp. *ecklonii* (Kunze) Schelpe (C)

SPERMATOPHYTA

Gymnospermae

CYCADACEAE

- Encephalartos natalensis* Dyer and Verdoorn (C)

Angiospermae

JUNCAGINACEAE

- Triglochin bulbosa* L. (A)

GRAMINEAE

- Imperata cylindrica* (L.) Beauv. var. *africana* (Anders.) C. E. Hubb. (W)
Trachypogon spicatus (L. f.) Kuntze (A, W)
Bothriochloa insculpta (Hochst.) A. Camus (W)
Cymbopogon excavatus (Hochst.) Stapf (C, F, W)
C. plurinodis Stapf (A, C, F, W)
Hyparrhenia filipendula (Hochst.) Stapf (A, C, W)
H. hirta (L.) Stapf (A, W)
Monocymbium ceresiforme (Nees) Stapf (A)
Heteropogon contortus (L.) Beauv. (A, W)
Themeda triandra Forsk. (A, W)
Perotis patens Gand. (A, W)
Paspalum commersonii Lam. (A, W)
P. dilatatum Poir. (A, W)
P. notatum Flüge (A, W)
Alloteropsis semialata Hitch. var. *ecklonii* Stapf (A)
Brachiaria serrata (Spreng.) Stapf (A, W)
Panicum aquinerve Nees (C, F)
P. maximum Jacq. (C, F)
Digitaria longiflora (Retz.) Pers. (C, F, W)
D. natalensis Sient (C, F, W)
Rhynchelytrum repens (Willd.) C. E. Hubb. (A, W)
R. setifolium (Stapf) Chiov. (A, W)
Optismenus hirtellus (L.) Beauv. (F)
Setaria chevalieri Stapf (F)

- S. flabellata* Stapf (W)
S. sphacelata (Schumach.) Stapf and C. E. Hubb. (C, F)
Ehrharta erecta Lam. (C, F)
Aristida barbicollis Trin and Rupr. (A)
A. junciformis Trin. and Rupr. (A, W)
Sporobolus capensis (Willd.) Kunth (A, W)
S. fimbriatus Nees (A, W)
S. pyramidalis Beauv. (A, W)
S. stapfianus Gand. (A, W)
Tristachya hispida (Thunb.) K. Schum. (A, W)
Loudetia simplex (Nees) C. E. Hubb. (A, W)
Microchloa caffra Nees (A)
Harpechloa falx (L.) Kuntze (A, W)
Chloris gayana Kunth (A, W)
Eleusine indica Gaertn. (W)
Pogonarthria squarrosa (Licht.) Pilger (W)
Trichoneura grandiglumis (Nees) Stapf and C. E. Hubb. (W)
Eragrostis capensis (Thunb.) Trin. (A, W)
E. curvula (Schrud.) Nees (A, W)
E. plana Nees (A, W)
E. racemosa (Thunb.) Steud. (A, W)
- CYPERACEAE**
Pycreus flavescens Reichb. (A)
P. polystachyus Beauv. (A)
Cyperus albostratus Schrad. (C, F)
C. semitrifidus Schrad. (A)
C. sphaerosperrus Schrad. (A)
C. tenax Boeck. (A)
Mariscus capensis Schrad. (A, W)
M. marlothii C.B.Cl. (A)
M. sieberianus Nees (A, W)
M. vestitus C.B.Cl. (A)
Kyllinga erecta Schumach. (A)
Fimbristylis dichotoma (L.) Vahl (A)
F. monostachya (L.) Hassk. (A, W)
Bulbostylis collina (Kunth) C.B.Cl. (A, W)
B. humilis Kunth (A, W)
B. oritrepes (Ridl.) C.B.Cl. (A)
Schoenoxiphium caricoides C.B.Cl. (F)
- ARACEAE**
Stylochiton natalense Schott (A)
Zantedeschia aethiopica Spreng. (W)
- COMMELINACEAE**
Commelina africana L. (A, W)
C. benghalensis L. (A, W)
Cyanotis nodiflora Kunth (W)
- LILIACEAE**
Chlorophytum comosum (Thunb.) Jacques (F)
Eriosperrum luteo-rubrum Bak. (F)
Aloe arborescens Mill. (W)
A. candelabrum Berger (W)
A. saponaria (Ait.) Harv. (A, W)
Tulbaghia acutifolia Harv. (A)
Drima alta R. A. Dyer (A)
Dracaena hookeriana K. Koch. (F)
Sansevieria guineensis (L.) Willd. (F, W)
S. thyrsiflora Thunb. (F, W)
Asparagus racemosus Willd. (F)
Begonia reticulata Didrichs (F)
- AMARYLLIDACEAE**
Haemanthus natalensis Pappe (C, F)
Hypoxis filifolia Bak. (A, W)
H. rigidula Bak. (A, W)
- DIOSCOREACEAE**
Dioscorea cotinifolia Kunth (C, F)
D. sylvatica Eckl. (C, F)
- IRIDACEAE**
Dietes vegeta (L.) N.E.Br. (F)
Lapeirousia laxa (Thunb.) N.E.Br. (W)
Watsonia densiflora Bak. (A)
- ORCHIDACEAE**
Stenoglottis fimbriata Lindl. (C)
Angraecum conchiferum Lindl. (C)
Mystacidium gracile Harv. (C, F)
- PIPERACEAE**
Peperomia reflexa (L. f.) A. Dietr. (C, F)
- ULMACEAE**
Trema orientalis (L.) Blume (F, W)
- MORACEAE**
Ficus burtt-davyi Hutch. (C, W)
F. capensis Thunb. (F)
F. ingens Miq. (W)
F. natalensis Hochst. (F)
F. sonderi Miq. (W)
- URTICACEAE**
Ureia tenax N.E.Br. (C)
Fleurya mitis Wedd. (F)
- SANTALACEAE**
Thesium costatum A. W. Hill (A, W)
- POLYGONACEAE**
Rumex sagittatus Thunb. (W)
Polygonum salicifolium Brouss. (W)
- AMARANTHACEAE**
Cyathula cylindrica Moq. (A, W)
Achyranthes aspera L. (W)
Gomphrena decumbens Jacq. (W)
- RANUNCULACEAE**
Clematis brachiata Thunb. (F)
- MENISPERMACEAE**
Cissampelos mucronata A. Rich. (C, F, W)
- CARYOPHYLLACEAE**
Dianthus basuticus Burtt Davy var. *grandiflorus* Hooper. (W)
Drymaria cordata Willd. (W)
- ANNONACEAE**
Popowia caffra (Sond.) Benth. (F)
- MONIMIACEAE**
Xymalos monospora Baill. (F)
- CRASSULACEAE**
Crassula heterotricha Schinz (C)
C. lineolata Dryand. (C)
C. setulosa Harv. (C)
- PIRTOSPORACEAE**
Pittosporum viridiflorum Sims (F)
- ROSACEAE**
Rubus rosaeifolius L. (F)

CONNARACEAE

Cnestis natalensis Planch. and Sond. . . . (F)

LEGUMINOSAE

Acacia ataxacantha DC. (F, W)

A. caffra (Thunb.) Willd. (W)

A. gerrardii Benth. (W)

A. nilotica (L.) Del. (W)

Dichrostachys cinerea (L.) Wight and Arn. (W)

Cassia plumosa (E. Mey.) Vogel (W)

Entada spicata (E. Mey.) Druce (F)

Crotalaria capensis Jacq. (A, W)

Trifolium burchellianum Ser. (W)

Calpurnia aurea (Ait.) Benth. (C, F)

Dichilus lebeckioides DC. (W)

Indigofera tristoides N.E.Br. (W)

Tephrosia polystachya E. Mey. (W)

Zornia capensis Pers. (A, W)

Dalbergia obovata E. Mey. (F, W)

Abrus precatorius L. (W)

Erythrina humeana E. Mey. (W)

E. latissima E. Mey. (W)

E. lysistemon Hutch. (W)

Rhynchosia caribaea DC. (A, W)

Vigna vexillata Benth. (A, W)

Dolichos falcatus Klein ex Willd. (F)

GERANIACEAE

Pelargonium aconitophyllum Eckl. and Zeyh. (F)

P. alchemilloides (L.) Ait. (F)

ERYTHROXYLACEAE

Erythroxylum emarginatum Thonn. . . . (F)

RUTACEAE

Fagara capensis Thunb. (F, W)

Vepris undulata Verdoorn (F)

Clausena anisata (Willd.) Hook. f. . . . (C, F)

BURSERACEAE

Commiphora harveyi Engl. (F)

MELIACEAE

Ekebergia pterophylla (C. DC.) O. Hoffm. (W)

POLYGALACEAE

Polygala hottentotta Presl. (A)

P. serpentina Eckl. and Zeyh. (A)

P. virgata Thunb. (F)

EUPHORBIACEAE

Micrococca capensis (Baill.) Prain. . . . (F)

Acalypha glabrata Thunb. (W)

Jatropha hirsuta Hochst. (A)

Clusia pulchella L. (F, W)

Excoecaria simii (Kuntze) Pax. (W)

Euphorbia clavarioides Boiss. (W)

E. ingens E. Mey. (W)

ANACARDIACEAE

Sclerocarya caffra Sond. (W)

Rhus dentata Thunb. (F, W)

R. fraseri Schonl. (W)

R. macowanii Schonl. (W)

R. pentheri Zahlbr. (W)

AQUIFOLIACEAE

Ilex mitis (L.) Radlk. (F)

CELASTRACEAE

Maytenus heterophylla (Eckl. and Zeyh.) H. K. B. Robson. (F, W)

M. mossambicensis (Klotzsch) Blakelock (F)

M. nemorosus (Eckl. and Zeyh.) Marais (W)

M. peduncularis (Sond.) Loes. (F)

M. undata (Thunb.) Blakelock. (F)

Pterocelastrus echinatus N.E.Br. (F)

Cassine tetragona Loes. (W)

SAPINDACEAE

Allophylus dregeanus (Sond.) De Winter (F)

A. erosus Radlk. (F, W)

A. melanocarpus (Sond.) Radlk. (F)

Hippobromus pauciflorus Radlk. (F, W)

MELIANTHACEAE

Bersama stayneri Phill. (F)

BALSAMINACEAE

Impatiens duthieae L. Bol. (F)

RHAMNACEAE

Ziziphus mucronata Willd. (W)

Phyllica paniculata Willd. (F, W)

Helinus integrifolius (Lam.) Kuntze . . . (W)

VITACEAE

Rhoicissus rhomboidea (E. Mey. ex Harv.) Planch. (C, F)

R. tomentosa (Lam.) Wild and Drummond (C, F)

TILIACEAE

Grewia occidentalis L. (C, F, W)

Triumfetta pilosa Roth. var. *tomentosa* Szyzyl. ex Sprague and Hutch. (F)

MALVACEAE

Pavonia columella Cav. (W)

STERCULIACEAE

Dombeya cymosa Harv. (W)

D. rotundifolia Planch. (W)

D. tiliacea (Encl.) Planch. (F)

OCHNACEAE

Ochna arborea Burch. ex DC. (F)

O. atropurpurea DC. (W)

FLACOURTIACEAE

Kiggelaria africana L. (F)

OLINIACEAE

Olinia emarginata Burt et Davy (F)

THYMELAEACEAE

Lasiosiphon kraussii Meisn. (F)

COMBRETACEAE

Combretum erythrophyllum (Burch.) Sond. (W)

C. gueinzii Sond. (W)

MYRTACEAE

Eugenia albanensis Sond. (F)

ARALIACEAE

Cussonia spicata Thunb. (W)

UMBELLIFERAE

- Heteromorpha trifoliata* (Wendl. and Bartl.)
Eckl. and Zeyh. (F)

MYRSINACEAE

- Maesa lanceolata* Forsk. (F, W)
Myrsine africana L. (A, F, W)
Rapanea melanophloeos (L) Mez. (F)

EBENACEAE

- Euclea natalensis* A. DC. (F)
Diospyros lycitoides Desf. (A, F, W)

SALVADORACEAE

- Azima tetraacantha* Lam. (W)

LOGANIACEAE

- Buddleia dysophylla* (Benth.) Radlk. (C, F)

GESNERIACEAE

- Sebaea grandis* (E. Mey.) Steud. (W)

APOCYNACEAE

- Carissa bispinosa* (L.) Desf. ex Brenan (F)

ASCLEPIADACEAE

- Riocrexia torulosa* Decne. (A)
Tenaris simulans N.E.Br. (A)
Asclepias multicaulis Schltr. (A)
Ceropegia meyeri Decne. (A)

BORAGINACEAE

- Ehretia rigida* (Thunb.) Druce. (W)

CONVOLVULACEAE

- Evolvulus alsinoides* L. (A, W)

VERBENACEAE

- Lantana rugosa* Thunb. (W)
Lippia javanica (Burm. f.) Spreng. (W)
Clerodendrum glabrum E. Mey. (C, F, W)

LABIATAE

- Leonotis leonurus* R.Br. (F)
Stachys cooperi Skan (F)
Plectranthus ciliatus E. Mey. ex Benth. (F)
P. fruticosus L'Hér. (F)
P. tomentosus Benth. (F, W)
Iboza riparia N.E.Br. (C, F, W)
Syncolostemon lanceolatus Guerke (W)
Becium obovatum N.E.Br. (A, W)

SOLANACEAE

- Lycium acutifolium* Miers (W)
Solanum giganteum Jacq. (W)
S. gracile Dun. (W)
S. mauritanium Scop. (F, W)

SCROPHULARIACEAE

- Diclis reptans* Benth. (A)
Halleria lucida L. (F)
Bowkeria triphylla Harv. (F)
Sutera floribunda Kuntze (W)
Ilysanthes nana Engl. (A)
Hebenstreitia elongata Bol. (A)
Selago natalensis Rolfe. (A)
Striga asiatica (L.) Kuntze. (A)
S. bilabiata (Thunb.) Kuntze (A)

GESNERIACEAE

- Streptocarpus haygarthii* N.E.Br. ex C.B.Cl. (F)

ACANTHACEAE

- Justicia protracta* (Nees) T. Anders. (W)
Chaetacanthus setiger (Pers.) Lindl. (W)
Ruellia cordata Thunb. (W)
Barleria meyeriana Nees (W)
Rhinacanthus communis Nees (W)

RUBIACEAE

- Burchellia bubalina* (L. f.) Sims (F)
Xeromphis rudis (E. Mey. ex Harv.) Codd (W)
Gardenia neuberia Eckl. and Zeyh. (F)
Rothmannia globosa (Hochst.) Keay (F)
Tricalysia lanceolata Sond. (F, W)
Pentanisia prunelloides (Klotzsch) Walp. (A, W)

- Vangueria infausta* Burch. (W)
Canthium ciliatum (Klotzsch) Kuntze. (F)
C. inerme (L. f.) Kuntze (F, W)
C. mundianum Cham. and Schlectd. (F, W)
Pachystigma latifolium Sond. (W)
P. macrocalyx (Sond.) Robyns. (W)
Galopina circaeoides Thunb. (W)
Dioclia natalensis (Hochst.) Garcia (W)
Pavetta breyeri Brem. (F)
P. lanceolata Eckl. (F)

DIPSACACEAE

- Scabiosa columbaria* L. (A, W)

CUCURBITACEAE

- Coccinia rehmannii* Cogn. (W)

CAMPANULACEAE

- Wahlenbergia madagascariensis* A. DC. (W)
W. undulata (Thunb.) A. DC. (W)
W. zeyheri Eckl. and Zeyh. (W)
Lobelia decipiens Sond. (A)
Cucumis zeyheri Sond. (A)

COMPOSITAE

- Vernonia corymbosa* Less. (F)
Erigeron floribundus (H.B.K.) Sch. Bip. (W)
Brachylaena elliptica Less. (W)
Helichrysum appendiculatum (L. f.) Less. (W)
H. aureo-nitens Sch. Bip. (A, W)
H. decorum DC. (A)
H. ericaefolium Less. (A)
Bidens pilosa L. (W)
Cineraria atriplicifolia DC. (W)
Senecio bupleuroides DC. (A)
S. inaequidens DC. (A)
S. latifolius DC. (A)
S. oxyriaefolius DC. (A, W)
S. polyanthemoides Sch. Bip. (W)
S. striatifolius DC. (A, W)
Berkheya bipinnatifida (Harv.) Roessler s. sp. (F)
bipinnatifida (F)
Dicoma anomala Sond. (W)
Gerbera kraussii Sch. Bip. (A, W)
Crepis hypchoeridea (DC.) Thell. subsp.
genuina (Thell.) Babc. (W)